Claims

1. An OLED device comprising:

(a) a substrate;

(b) a first electrode layer disposed over the substrate;

(c) an inorganic short reduction layer disposed over the first electrode layer;

(d) a charge injection layer disposed over the inorganic short reduction layer;

(e) an organic EL element disposed over the charge injection layer; and

(f) a second electrode layer over the organic EL element, wherein the short reduction layer is selected to have a thickness and resitivity sufficient to reduce the leakage current and the associated loss of emission efficiency due to shorting defects.

2. The OLED device of Claim 1 wherein the first electrode layer is the anode.

3. The OLED device of Claim 1 wherein the short reduction layer is selected from indium oxide, gallium oxide, zinc oxide, tin oxide, molybdenum oxide, vanadium oxide, antimony oxide, bismuth oxide, rhenium oxide, tantalum oxide, tungsten oxide, niobium oxide, or nickel oxide.

4. The OLED device of Claim 3 wherein the short reduction layer is a mixture of at least two of the listed oxides.

5. The OLED device of Claim 3 wherein the short reduction layer is a mixture of at least one of the listed oxide materials and an electrically insulating oxide, fluoride, nitride, or sulfide material.

6. The OLED device of Claim 1 wherein one of the two electrode layers is a transparent conductive oxide layer and the other electrode layer is metallic.

7. The OLED device of Claim 1 wherein both electrode layers are metallic and at least one of the two electrode layers is semitransparent to the emitted light.

8. The OLED device of Claim 1 wherein the short reduction layer is 10 nm or more in thickness.

9. The OLED device of Claim 1 wherein the short reduction layer is between 20 nm and 200 nm in thickness.

10. An OLED device comprising:

(a) a substrate;

(b) a first electrode layer disposed over the substrate;

(c) an organic EL element disposed over the first electrode layer;

(d) a charge injection layer disposed over the organic EL element;

(e) an inorganic short reduction layer disposed over the charge injection layer; and

(f) a second electrode layer disposed over the short reduction layer, wherein the short reduction layer is selected to have a thickness and resitivity sufficient to reduce the leakage current and the associated loss of emission efficiency due to shorting defects.

11. A high resolution pixilated OLED display comprising:

(a) a substrate;

(b) a first electrode layer disposed over the substrate;

(c) an inorganic short reduction layer disposed over the first electrode layer;

(d) an organic EL element disposed over the short reduction layer;

(e) a second electrode layer over the organic EL element, wherein the short reduction layer is selected to have a through-thickness resistivity between 10 ohm-cm^2 to 1500 ohm-cm^2.

12. The OLED display of Claim 11 wherein a charge injection layer is disposed between the inorganic short reduction layer and the organic EL element.

13. The OLED display of Claim 11 wherein the short reduction layer is selected from indium oxide, gallium oxide, zinc oxide, tin oxide, molybdenum oxide, vanadium oxide, antimony oxide, bismuth oxide, rhenium oxide, tantalum oxide, tungsten oxide, niobium oxide, or nickel oxide..

14. The OLED display of Claim 13 wherein the short reduction layer is a mixture of at least two of the listed oxides..

15. The OLED display of Claim 13 wherein the short reduction layer is a mixture of at least one of the listed oxide materials and an electrically insulating oxide, fluoride, nitride, or sulfide material.

16. The OLED display of Claim 11 wherein one of the two electrode layers is a transparent conductive oxide layer and the other electrode layer is metallic.

17. The OLED display of Claim 11 wherein both electrode layers are metallic and at least one of the two electrode layers is semitransparent to the emitted light.

18. The OLED display of Claim 11 wherein the short reduction layer is 10 nm or more in thickness.

19. The OLED display of Claim 11 wherein the short reduction layer is between 20 nm and 200 nm in thickness.

20. An OLED device having one or more large light emitting light emitting segments, comprising:

(a) a substrate;

(b) a first electrode layer disposed over the substrate;

(c) an inorganic short reduction layer disposed over the first electrode layer;

(d) an organic EL element disposed over the short reduction layer; and

(e) a second electrode layer over the organic EL element,

wherein the short reduction layer is selected to have a through-thickness resistivity is between 10^{-2} ohm-cm^2 to 10^{-7} ohm-cm^2.

21. The OLED device of Claim 20 wherein a charge injection layer is disposed between the inorganic short reduction layer and the organic EL element.

22. The OLED device of Claim 20 wherein the short reduction layer is selected from indium oxide, gallium oxide, zinc oxide, tin oxide, molybdenum oxide, vanadium oxide, antimony oxide, bismuth oxide, rhenium oxide, tantalum oxide, tungsten oxide, niobium oxide, or nickel oxide..

23. The OLED device of Claim 22 wherein the short reduction layer is a mixture of at least two of the listed oxides..

24. The OLED device of Claim 22 wherein the short reduction layer is a mixture of at least one of the listed oxide materials and an electrically insulating oxide, fluoride, nitride, or sulfide material.

25. The OLED device of Claim 20 wherein one of the two electrode layers is a transparent conductive oxide layer and the other electrode layer is metallic.

26. The OLED device of Claim 20 wherein both electrode layers are metallic and at least one of the two electrode layers is semitransparent to the emitted light.

27. The OLED device of Claim 20 wherein the short reduction layer is 10 nm or more in thickness.

28. The OLED device of Claim 20 wherein the short reduction layer is between 20 nm and 200 nm in thickness.